

Remarks:

This amendment is submitted in an earnest effort to advance this case to issue without delay.

The main claim has been amended to recite the treatment temperature defined in the original application papers on page 6 at lines 21 and 22. Thus the claim makes it clear that the instant invention is a one-step process that hardens a surface area without actually applying a coating to it.

More specifically, the main reference - German 2,504,817 (US equivalent = 3,988,955) of Engel - describes a method wherein the substrate is first hardened to make it martensitic. Then it is ion-plated by vaporizing the coating metal and then applying it to the workpiece to produce a relative thick coating some 0.0254 mm thick. The thus applied coating then is converted into a carbide, nitride, or boride in a special plating chamber under high vacuum. Subsequently the thus treated substrate is subjected to a pulse hardening so that its outer edges are plated and then hardened.

According to the instant invention the substrate is hardened and ions of the hardening material are sputtered onto it. There is no vaporization needed since the plasma itself creates the necessary nitride, carbide, or the like. The preexisting marten-

sitic grain structure is not changed; instead the transcrystalline implantation of ions changes its composition so as to change the hardness and resistance to corrosion.

The differences between Engel and the instant invention can be summarized as follows:

	Engel	This application
Applied Vacuum	0.0000266 mbar	0.1 mbar
Operating pressure	0.0266 mbar	1 mbar
Treatment temperature	600-900°C	180-350°C
Coating thickness	0.0254 mm	<0.001mm.

The recitation of the lower temperature range makes it clear that this is not a vaporization-type coating operation and excludes the process of Engel. Thus amended claim 1 clearly defines over this reference and is allowable over Engel. The process is different, and the resultant workpiece has a much thinner hardened coating than in Engel.

Thus the claims in the case are clearly in condition for allowance over the cited art. Notice to that effect is earnestly solicited.


If only minor problems that could be corrected by means of a telephone conference stand in the way of allowance of this

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case, the examiner is invited to call the undersigned to make the necessary corrections.

Respectfully submitted,  
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Enclosure:                      None